

1. A method to form a transistor gate in the manufacture of an integrated circuit device, said method comprising:
  - providing a substrate;
  - forming a conductor layer overlying said substrate
  - 5 with a dielectric layer therebetween;
  - forming a masking layer overlying said conductor layer;
  - forming a resist layer overlying said masking layer;
  - patterning said resist layer to thereby selectively
  - 10 expose said masking layer wherein said resist layer exhibits a first spacing between edges of said resist layer;
  - etching through said exposed masking layer to thereby selectively expose said conductor layer wherein etched
  - 15 edges of said masking layer are tapered such that said masking layer exhibits a second spacing between said masking layer edges at the top surface of said conductor layer and wherein said second spacing is less than said first spacing; and
  - 20 etching through said exposed conductor layer to thereby complete a transistor gate.
2. The method according to Claim 1 wherein said conductor layer comprises polysilicon.

3. The method according to Claim 1 wherein said masking layer comprises silicon nitride.

4. The method according to Claim 1 wherein said step of etching through said exposed masking layer comprises a dry etch further comprising an etching chemistry of  $\text{CFH}_3$ ,  $\text{CF}_4$ ,  $\text{O}_2$ , and He.

5. The method according to Claim 1 wherein the angle of the edges of said masking layer with respect to the top surface of said substrate is between about  $45^\circ$  and about  $85^\circ$ .

6. The method according to Claim 1 wherein said masking layer comprises a thickness of between about 600 Å and about 4,000 Å.

7. The method according to Claim 1 further comprising forming an isolation region in said substrate wherein said masking layer etched edges overlie said isolation region.

8. The method according to Claim 1 wherein said transistor gate is a floating gate of a non-volatile memory device.

9. The method according to Claim 8 further comprising:

forming a control gate overlying said floating gate  
wherein said control gate comprises a second conductor  
layer overlying a second dielectric layer; and

5 forming source and drain regions in said substrate.

10. A method to form a floating gate of a non-volatile  
device in the manufacture of an integrated circuit device,  
said method comprising:

providing a substrate;

5 forming an isolation region in said substrate

forming a conductor layer overlying said substrate  
with a dielectric layer therebetween;

forming a masking layer overlying said conductor  
layer;

10 forming a resist layer overlying said masking layer;

patterning said resist layer to thereby selectively  
expose said masking layer wherein said resist layer  
exhibits a first spacing between edges of said resist  
layer;

15 etching through said exposed masking layer to thereby  
selectively expose said conductor layer wherein etched  
edges of said masking layer are tapered such that said

masking layer exhibits a second spacing between said  
masking layer edges at the top surface of said conductor  
20 layer and wherein said second spacing is less than said  
first spacing and wherein said masking layer etched edges  
overlie said isolation region; and

etching through said exposed conductor layer to  
thereby complete a floating gate of a non-volatile memory  
25 device.

11.The method according to Claim 10 wherein said conductor  
layer comprises polysilicon.

12.The method according to Claim 10 wherein said masking  
layer comprises silicon nitride.

13.The method according to Claim 10 wherein said step of  
etching through said exposed masking layer comprises a dry  
etch further comprising an etching chemistry of  $\text{CFH}_3$ ,  $\text{CF}_4$ ,  
 $\text{O}_2$ , and He.

14.The method according to Claim 10 wherein the angle of  
the edges of said masking layer with respect to the top  
surface of said substrate is between about  $45^\circ$  and about  
 $85^\circ$ .

15. The method according to Claim 10 wherein said masking layer comprises a thickness of between about 600 Å and about 4,000 Å.

16. The method according to Claim 10 further comprising:

forming a control gate overlying said floating gate wherein said control gate comprises a second conductor layer overlying a second dielectric layer; and

5 forming source and drain regions in said substrate.

17. A method to form a non-volatile device in the manufacture of an integrated circuit device, said method comprising:

providing a substrate;

5 forming a shallow trench isolation in said substrate

forming a polysilicon layer overlying said substrate with a dielectric layer therebetween;

forming a masking layer overlying said polysilicon layer;

10 forming a resist layer overlying said masking layer;

patterning said resist layer to thereby selectively expose said masking layer wherein said resist layer

TS-03-373

exhibits a first spacing between edges of said resist layer;

15       etching through said exposed masking layer to thereby selectively expose said polysilicon layer wherein etched edges of said masking layer are tapered such that said masking layer exhibits a second spacing between said masking layer edges at the top surface of said polysilicon layer and wherein said second spacing is less than said  
20       first spacing and wherein said masking layer etched edges overlies said isolation region;

          etching through said exposed polysilicon layer to thereby complete a floating gate;

25       forming a control gate overlying said floating gate wherein said control gate comprises a second conductor layer overlying a second dielectric layer; and

          forming source and drain regions in said substrate to complete a nonvolatile device.

18. The method according to Claim 17 wherein said step of etching through said exposed masking layer comprises a dry etch further comprising an etching chemistry of  $\text{CFH}_3$ ,  $\text{CF}_4$ ,  $\text{O}_2$ , and He.

19. The method according to Claim 17 wherein the angle of

TS-03-373

the edges of said masking layer with respect to the top surface of said substrate is between about 45° and about 85°.

20. The method according to Claim 17 wherein said masking layer comprises a thickness of between about 600 Å and about 4,000 Å.